PREVALENCE AND DISTRIBUTION OF SELECTED DEVELOPMENTAL DENTAL ANOMALIES AMONG PATIENTS VISITING K.S.R. INSTITUTE OF DENTAL SCIENCE AND RESEARCH, TIRUCHENGODE

A Dissertation submitted in

partial fulfillment of the requirements

for the degree of

MASTER OF DENTAL SURGERY

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DECLARATION BY THE CANDIDATE

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LIST OF ABBREVIATIONS

1.	AI	Amelogenesis Imperfecta
2.	DI	Dentinogenesis Imperfecta
3.	TP	Transposition
4.	TM	Transmigration

INTRODUCTION

INTRODUCTION

There are little available epidemiological data on the anomalies associated with the dentition in Indian population. Studies are undertaken on individual anomalies related to teeth and that too on a smaller sample size. In most studies the sample size is too small to reach valid conclusions regarding the distribution of dental anomalies. The dental anomalies, developmental or congenital could be related to some hereditary conditions, syndromes or may be environmental.

Evidence has been accumulating, that biologically links some dental abnormalities occurring together more frequently than would be expected by chance alone. These related abnormalities include variation in tooth number, size, shape, structure, eruption chronology and sequencing. [1] It is important to treat these anomalies because they can create disturbances in maxillary and mandibular dental arches and occlusion. [2]

This longitudinal epidemiological survey study is an attempt to evaluate and increase the insight in the prevalence of dental anomalies. This study can be a new contribution to the literature. [2]

AIMS AND OBJECTIVES

AIMS

The aim of this study is to determine the prevalence and distribution of selected developmental dental anomalies in size, shape, number, structure and position of teeth among patients visiting K.S.R. Institute of Dental Science and Research, Tiruchengode, Tamilnadu and to statistically analyze the distribution of these anomalies.

OBJECTIVES

Developmental dental anomalies of the dentition are not infrequently observed by the dental practitioner. Several studies reported the prevalence of various dental anomalies in different populations, but the results are conflicting. The discrepancies in their results were attributed to variable sampling techniques, racial differences and different diagnostic criteria.

The main objective of this study is to investigate the prevalence and distribution of selected dental anomalies and to identify the association among these anomalies in patients visiting K.S.R. Institute of Dental Science and Research, Tiruchengode, Tamilnadu.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Palomino (1978) [3] examined the frequency of dental anomalies in American-Indian population in western Bolivia and found the frequencies of dental anomalies were low. The frequencies of dental anomalies recorded in the 323 persons were: supernumerary teeth, 1 case; fusion of teeth, 1 case; hypoplasia, 3 cases; hypodontia of upper laterals, 2 cases; peg-shaped upper laterals, 1 case; and barrel-shaped upper laterals, 2 cases.

Salem (1989) [4] has done a study in Gizan population, the prevalence of selected dental anomalies was studied among 2,393 children 4 to 12 years old .The results showed that the most common dental anomaly was hypodontia (2.2%), followed by supernumerary (0.50%), peg-shaped lateral incisors (0.37%) and gemination (0.08%).

Al-Emran (1990) [5] studied the prevalence of hypodontia and congenital malformations in permanent teeth of 500 male Saudi children in Riyadh. The findings indicated that hypodontia was present in about 4% of the children. Most frequently affected were the mandibular second premolars, maxillary laterals and maxillary second premolars. Tooth malformations, mainly peg-shaped upper lateral incisors, were also observed in about 4% of the sample.

Davis & Darvell (1993) [6] has done a radiographic survey of a random sample of 454 girls and 521 boys was undertaken to establish data on the incidence of congenitally missing mandibular incisor teeth amongst the Southern Chinese. The proportion of 5-year-old girls and boys affected by hypodontia in the permanent mandibular incisor region was 0.086 and 0.046 respectively, compared with 0.047 and 0.034 for 12-year-olds.

Peck S (1996) [1] has done a study on fifty eight non syndromic North American white orthodontic patients with palatal displacement of one or both maxillary canine teeth were studied for associated tooth agenesis and peg shaped maxillary lateral incisors. Agenesis

of permanent teeth was identified by x ray film analysis. Peg shape anomaly of maxillary lateral incisors was determined by direct observation. Increase in the absence of third molars and second premolars associated with the palatally displaced canine were statistically very significant compared with normative data of prevalence of tooth agenesis. In contrast, the prevalence of peg laterals agenesis in palatally displaced canine sample showed no difference statistically compared with reference values.

Tsai and King (1998) [7] evaluated the prevalence of dental anomalies in the southern Chinese population. 3.6% exhibited generalized macrodontia; 2.5% exhibited relative macrodontia of either the maxillary central or lateral incisor; 6.9% exhibited generalized microdontia; 3.3% exhibited localized microdontia which usually affects the maxillary lateral incisors and third molars; and 0.8% exhibited the prevalence of double teeth. The prevalence of hyperdontia was 2.2%, while the prevalence of hypodontia was 7.3% with the most frequently missing tooth the mandibular incisor.

Ghaznawi et al. (1999) [8] has done a study in Jeddah, the prevalence rates of 10 selected dental anomalies were determined among 1,010 dental patients. Results showed that hypodontia was the most prevalent (9.41%), followed by taurodontism (8.61%) and microdontia (5.35%). Other anomalies were found at lower frequencies ranging from 0.20% for transposition to 1.19% for dilacerations.

Rolling et al. (2001) [9] pointed out that oligodontia occurs in 0.16% of Danish school children. Two of every three congenitally missing teeth were upper or lower second premolars or upper lateral incisors, and the condition was more frequent in girls than in boys.

Thilander et al. (2001) [10] studied the prevalence of dental anomalies in a group of patients in Bogata, Colombia. The prevalence of different dental anomalies was as follows: 3.2% congenitally missing teeth (the mandibular second premolar was the most affected);

1.8% supernumerary teeth (mainly mesodens); 6.5% deviation from normal dental morphology (microdontia was four times as common as macrodontia).

Rajab LD (2002) [11] has done a study was conducted on 152 children who visited the department of Pediatric Dentistry at Jordan University Hospital. Patient's age ranged from 5 to 15 years. Supernumerary teeth were detected by clinical examination and radiographs. It was found that males were affected more than females with a sex ratio of 2.2:1. 77 % of patients had one supernumerary teeth.18.4% had double teeth, 4.6% had 3 or more supernumeraries.90% of supernumerary teeth occurred in pre-maxilla of which 92.8% were in the central incisor region and of these latter 25% were located in the midline. The other 10.4% of the supernumeraries were located in premolar, canine, molar, and lower central incisor regions.

Osuji & Hardie (2002) [12] has done a study in Tabuk, the prevalence of missing teeth, supernumerary teeth including mesiodens, fused teeth and talon cusps was studied in 1878 children attending the North West Armed Forces Hospital, Tabuk. It was found that the most frequent missing tooth was the mandibular second premolars (48%).

Nunn et al. (2003) [13] the reported frequencies of hypodontia are based on the population studied. There is a great variation in the literature among the different ethnic groups; in Africans and Australian Aborigines the prevalence was 1%, but it was 30 times higher in Japanese people.

Hamasha and Al-Khateeb (2004) [14] investigated the prevalence of fusion and gemination in a sample of Jordanian dental patients and the results were 0.19% and 0.22% respectively. The maxillary central incisors were the most commonly affected (3.6%), followed by mandibular third molars (0.9%).

Soto-Rojas AE (2004) [15] has done a study was conducted in which clinical, experimental, and review reports were searched for in a number of bibliographic databases for scientific literature, using the search phrase 'Fluorosis and Mexico'. All the materials that were initially identified had to satisfy eight specific criteria in order to be included in their study. It was found that, of their 24 publications that the literature search had yielded, 14 satisfied all the inclusion criteria. The prevalence of dental fluorosis reported in Mexico ranged from 30 to 100 % in areas where water was naturally fluoridated. Most of the 14 studies were conducted where fluoride levels were above optimal and fluorosis cases ranged from 'mild' to 'severe'.

Yilmaz HH (2005) [16] has done a study was conducted to evaluate the prevalence of tooth transposition in a Turkish population, possibly associated dental anomalies and whether side laterality , gender expression or genetic influence exits or not. Panoramic radiographs of 5486 patients referred to the Department of Oral Diagnosis and Radiology, University of Suleman Demirel between April 2003 and March 2004 were examined retrospectively. All patients with tooth transpositions were recalled for detailed clinical examination and medical history. Age, sex, history of trauma, localization of transposition and associated congenital anomalies were recorded with details. It was found that the prevalence of tooth transposition was 0.38% in a Turkish population. Maxillary canine-lateral incisor transposition was found to have a higher frequency than maxillary canine-first premolar transposition. Maxillary canine and second premolar transposition had not been described in the literature but was observed in one of their cases. Similar frequencies were found in both sexes.

Oneyeaso (2006) [17] a study was done in Nigeria to evaluate the prevalence of dental anomalies in Nigerian schoolchildren. It found that 3.6% of the sample had missing permanent teeth, 1.4% had supernumerary teeth, and 1.9% had double teeth.

Altug-Atac AT (2007) [2] has done a study on 3043 Turkish children was conducted to determine the prevalence of developmental anomalies based on dental casts, intraoral radiographs and panoramic radiographs who had undergone orthodontic treatment at the Department of Orthodontics at the University of Ankara between 1978 and 2003. These patients were examined for fusion, gemination, microdontia, macrodontia, oligodontia, hyperdontia, and amelogenesis imperfecta. It was found that 5.46% of the total group had at least one developmental anomaly and was concluded that hypodontia was the most common developmental anomaly in Turkish population.

Ezoddini et al. (2007) [18] has done a study in Iran population on the prevalence of dental anomalies on 480 patients showed that 40.8% had dental anomalies, with 49.1% males and 33.8% females. The most common anomaly was dilacerations (15%) followed by impacted teeth (8.3%), taurodontism (7.5%), and supernumerary teeth (3.5%). Macrodontia and fusion were detected in only few cases (0.2%).

Chung et al. (2008) [19] conducted a study on the prevalence of hypodontia in 1622 Korean subjects, researchers found hypodontia in 11.2% of the sample. The mandibular lateral incisor and second premolar were the most frequently missing teeth.

Maatouk et al. (2008) [20] conducted a study on 262 children, 12-18 year-old in Tunisia to measure the prevalence of hypodontia. The results showed that the most affected tooth was the mandibular second premolar.

Goya et al. (2008) [21] studied the prevalence of hypodontia of permanent teeth in 2072 Japanese pediatric patients. The results showed that girls had a higher prevalence of missing teeth (10.8%) than boys (8.7%).

Kuchler et al. (2008) [22] investigated the frequency of hypodontia in 1167 subjects in United States of America (USA) and found that 4.8% of the studied population had tooth agenesis. The male: female ratio varied from 2:1 in the hypodontia of the upper lateral incisors to 5:1 in premolar hypodontia.

Prskalo et al. (2008) [23] has done a study to evaluate the prevalence of lateral incisor hypodontia and canine impaction in Croatia. The study included 568 examinees age 6 to 22 years. The results showed that the prevalence of lateral incisors hypodontia was 2.46%, while canine impaction was found in 4.71% of the participants.

Garib DG (2009) [24] has done a study was carried out to evaluate the prevalence of dental anomalies in patients with agenesis of second premolar and compare the findings with the prevalence of these anomalies in general population. A Brazilian sample of 203 patients aged 8 to 22 years was selected. All patients presented agenesis of at least one second premolar. The presence of other associated dental anomalies including agenesis of the other permanent teeth, ectopia of unerupted permanent teeth, infraocclusion of deciduous molars, microdontia of maxillary lateral incisors and supernumerary teeth were analysed by panoramic and periapical radiographs and dental casts. It was found that the sample with agenesis of at least one second premolar presented a significantly increased prevalence rate of permanent tooth agenesis (21%) excluding third molars.

Fujita et al. (2009) [25] investigated the prevalence of developmental anomalies of permanent lateral incisors among 1,375 patients in Japan. The prevalence of hypodontia of the lateral incisors was 7.3%, with more girls than boys affected.

Guttal KS et al. (2010) [26] has done a study on the frequency of developmental dental anomalies in Indian population. This prospective study was conducted over a period of one year and comprised both clinical and radiographic examinations. Adult patients were

screened for the presence of dental anomalies with appropriate radiographs. A comprehensive clinical examination was performed to detect hyperdontia, talon cusp, fused teeth, gemination, concrescence, hypodontia, dens invaginatus, dens evaginatus, macrodontia and microdontia and taurodontism. Patients with syndromes were not included in the study. Out of the 20,182 patients screened, 350 had dental anomalies. Of these, 57.43% of anomalies occurred in male patients and 42.57% occurred in females. Hyperdontia, root dilaceration, peg-shaped laterals (microdontia), and hypodontia were more frequent compared to other dental anomalies of size and shape.

Saurabh K. Gupta et al. (2011) [27] conducted a study on Indian population. His study was based on clinical examination, evaluation of dental casts and panoramic radiographs. A total of 1123 subjects were included and examined for developmental dental anomalies in shape, number, structure and position. The percentages of these anomalies were assessed and compared using statistical analysis. Among 1123 subjects, a total of 385 individuals (34.28%) presented with selected developmental dental anomalies. The distribution by sex was 197 males (34.44%) and 188 females (34.06%). The most common developmental dental anomaly was rotation (10.24%), followed by ectopic eruption (7.93%). The next common group was number anomalies. The most common number anomaly was hypodontia (4.19%), which had a higher frequency than hyperdontia (2.40%). Analyzing the next prevalent group of shape anomalies, microdontia (2.58%) was found to be the most common, followed by taurodontism (2.49%), dens evaginatus (2.40%) and talon cusp (0.97%). Dentinogenesis imperfecta (0.09%) was the rarest, followed by amelogenesis imperfecta (0.27%) and fusion (0.27%).

Abbas Shokri et al. (2014) [28] has done a study on the prevalence of developmental dental anomalies among 7 to 35 year old people in Iran observed using panoramic radiographs. A cross sectional study was conducted on 1649 subjects. Dental anomalies were

divided into four types: (a) shape (including fusion, taurodontism, and dens invagination); (b) number (including hypodontia, oligodontia, and hyperdontia); (c) structure (including amelogenesis imperfecta, dentinogenesis imperfecta, and dentin dysplasia); and (d) position (including displacement, impaction, and dilacerations). Anomalies of position and number were the most common types of abnormalities, and anomalies of shape and structure were the least in both genders. Anomalies of impaction (44.76%), dilacerations (21.11%), hypodontia (15.88%), taurodontism (9.29%), and hyperdontia (6.76%) were the most common subtypes of dental anomalies. The anomalies of shape and number were more common in the age groups of 7-12 years and 13-15 years, respectively, while the anomalies of structure and position were more common among the other age groups.

MATERIALS AND METHODS

MATERIALS AND METHODS

ARMAMENTARIUM

1. Mouth mirror
2. Probe
3. Explorer
4. Tweezer
5. Intraoral mirror
6. Measuring scale
7. Divider
8. Cheek retractor
9. Cotton pieces
10. Mask
11. Gloves

SOURCE OF DATA

The study sample will comprise of 94,507 subjects in age range of 14 to 79 years, randomly screened who visited the outpatient Department of Oral Medicine and Radiology of K.S.R INSTITUTE OF DENTAL SCIENCE AND RESEARCH, TIRUCHENGODE, TAMILNADU, between April 2014 to September 2015 (One and half years), after obtaining their informed consent.

INCLUSION CRITERIA

1. Only subjects of Indian origin were selected.
2. Clinically evident anomalies were only included
3. Subjects with developmental anomalies in size, shape, number, structure, and position.
4. Syndromic patients with multiple dental anomalies will be included.

EXCLUSION CRITERIA

1. Teeth missing due to caries, periodontal conditions, and traumatic injuries.
2. History of extraction or orthodontic treatment.
3. Patients belonging to the pediatric age group (under the age of 14)
4. Patients having cleft lip and palate.
5. Radiographic evident anomalies which were not evident clinically were excluded.

METHODS

The present study will evaluate 94,507 subjects (From April 2014 to September 2015) randomly screened patients for the presence of dental anomalies. The study will be undertaken with the aid of clinical examination and intraoral photographs. The following dental anomalies were assessed:-

1. Disturbance in size (Microdontia, Macrodontia)
2. Disturbance in shape (Talon cusps, Dens evaginatus, Fusion, Peg-shaped lateral incisors).
3. Disturbance in number (Hyperdontia, Hypodontia).
4. Disturbances in structure (Amelogenesis imperfecta, Dentinogenesis imperfecta).
5. Disturbance in position (Transposition, Transmigration).

SIZE ANOMALIES

Microdontia and Macrodontia

For evaluating microdontia and macrodontia, only gross deviations in sizes discernible easily by clinical judgment were accepted.

SHAPE ANOMALIES

Talon cusp

Talon cusp is a prominent accessory cusp like structure projecting from the cingulum area or CEJ of the maxillary or mandibular teeth in both permanent and primary dentition. In my study the primary dentition was excluded. Clinically, to consider a projection as a talon cusp, it must extend at least 1mm beyond the CEJ or half the distance from the CEJ to the incisal edge.

Dens evaginatus

The presence of an extra cusp, elevation, excrescence, bulge, protuberance or tubercle from the occlusal surface of posterior teeth is called dens evaginatus.

Fusion

Single enlarged tooth or joined tooth in which the tooth count reveals a missing tooth clinically, when the anomalous tooth is counted as one.

Peg-shaped lateral incisors

One of the common forms of localized microdontia is that which affects the maxillary lateral incisor, a condition that has been called the peg lateral. Instead of exhibiting parallel or diverging mesial and distal surfaces, the sides converge or taper incisally, forming a peg-shaped or cone-shaped crown. The root of such tooth is frequently shorter than usual.

STRUCTURAL ANOMALIES

Amelogenesis imperfecta

An enamel defect can manifest itself as a deficiency in either the amount of enamel formed (hypoplasia) or the degree of calcification of the formed organic matrix (hypocalcification or hypomaturation). In this study, AI was evaluated without dividing the cases into subgroups.

Dentinogenesis imperfect

DI represents a group of hereditary conditions that are characterized by abnormal dentin formation. DI was also evaluated without dividing the cases into subgroups.

NUMBER ANOMALIES

Hypodontia

Hypodontia describes a situation where the patient has missing 6 teeth or fewer, excluding the third molars.

Hyperdontia

Hyperdontia is the development of an increased number of teeth, and the additional teeth are termed as supernumerary.

POSITIONAL ANOMALIES

Transposition

Tooth transposition is a disturbance of tooth eruption and is defined as change in the position of two adjacent teeth within the same quadrant.

Transmigration

Transmigration is defined as the migration of tooth across the jaw midline without the influence of any pathological entity.

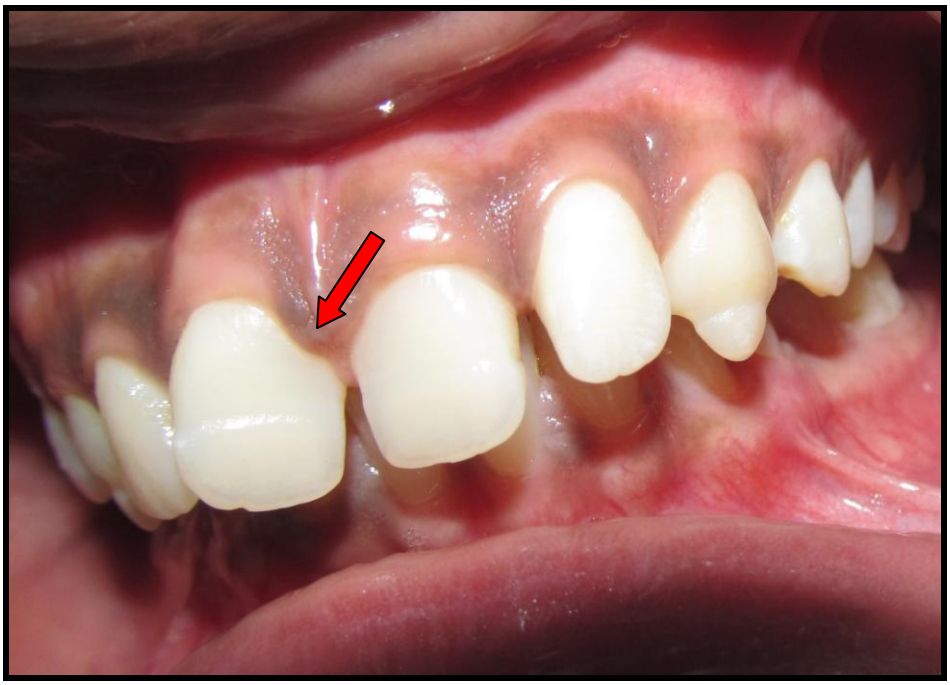
DATA COLLECTION

All the details of the patient were entered into the proforma sheet which included patient details as well as the type of anomalies. Proforma was filled for the patient with at least one developmental dental anomaly. Data collected were entered into a spreadsheet (Excel 2007; Microsoft Office, Microsoft Corporation, USA) and analyzed subsequently using the Statistical Package for Social Sciences (Windows version 17.0; SPSS Inc., Chicago, IL, USA).

FIGURE 1: ARMAMENTARIUM

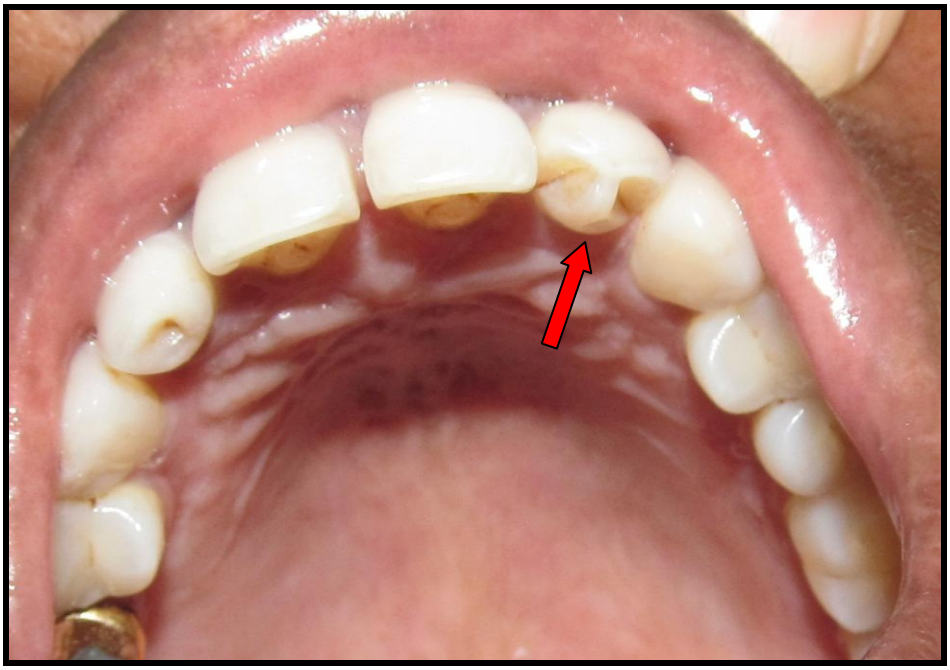
FIGURE 2: SIZE ANOMALIES

(a) Microdontia

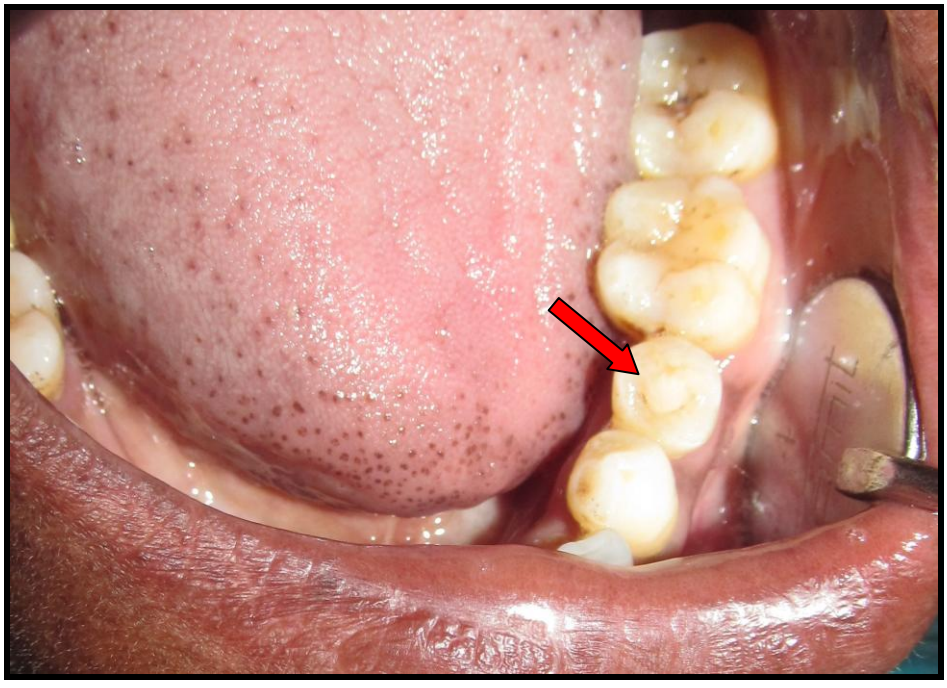


(b) Macrodontia

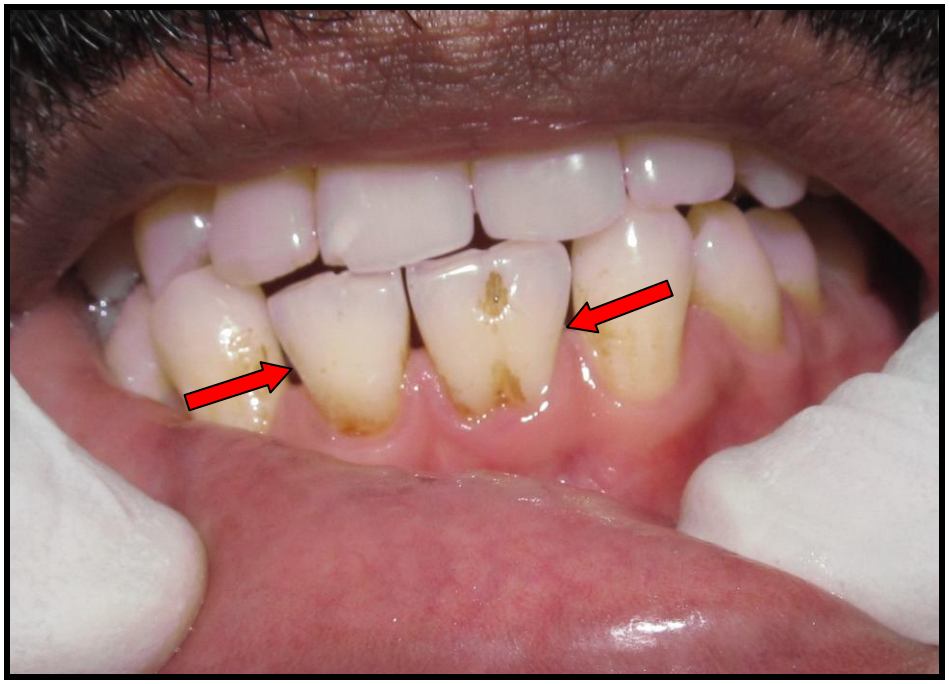
FIGURE 3: SHAPE ANOMALIES



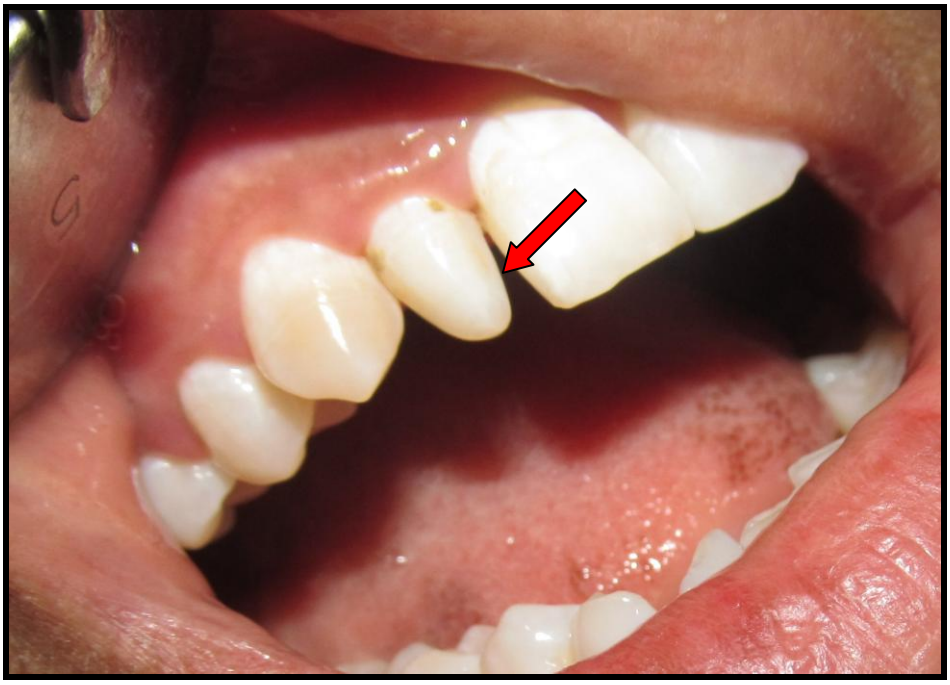
(a) Talon cusp



(b) Dens evaginatus



(c) Fusion



(d) Peg-shaped lateral incisor

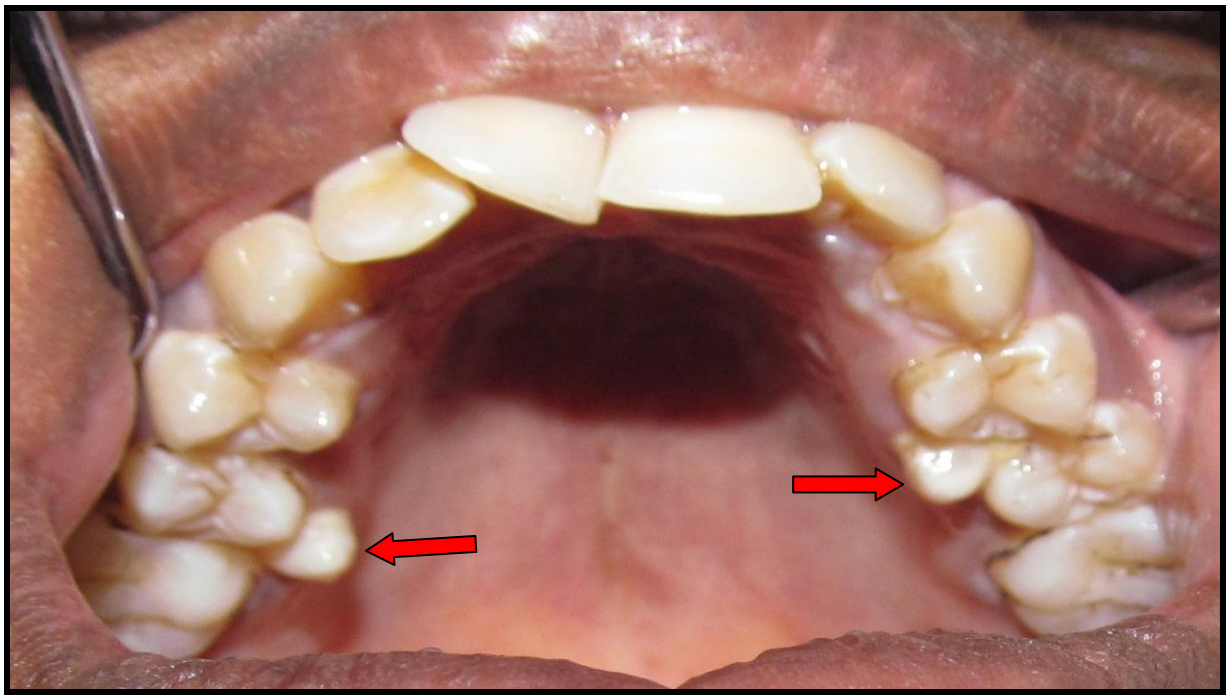
FIGURE 4: STRUCTURAL ANOMALIES

(a) Amelogenesis imperfecta

(b) Dentinogenesis imperfecta

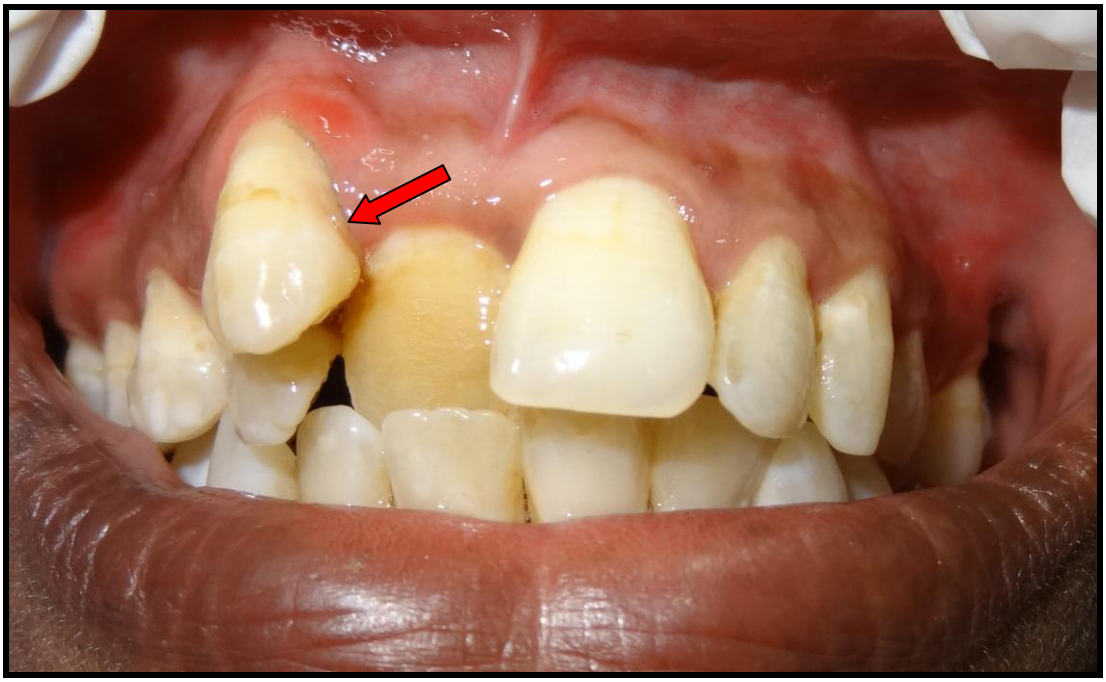
FIGURE 5: NUMBER ANOMALIES

(a) Hypodontia

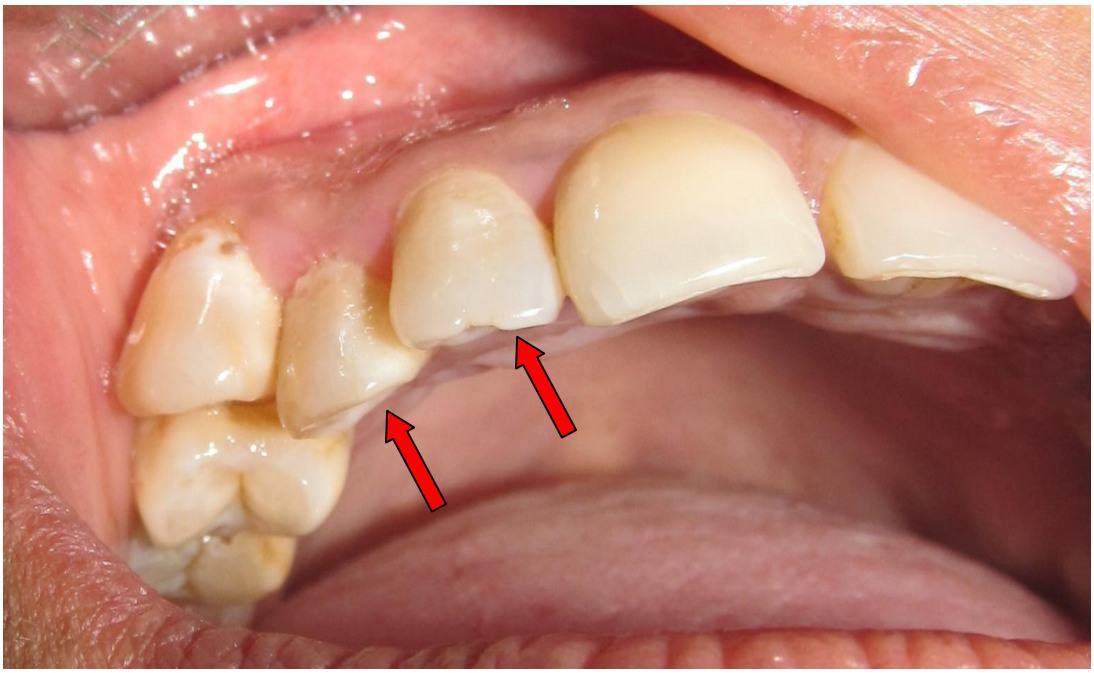


(b) Hyperdontia

FIGURE 6: POSITIONAL ANOMALIES



(a) Transposition



(b) Transmigration

STATISTICAL ANALYSIS

STATISTICAL ANALYSIS

Data obtained was analyzed using Statistical package for Social Sciences (SPSS) software version 17.0 (Windows version 17.0; SPSS Inc., Chicago, IL, USA). The prevalence rates of different developmental dental anomalies were assessed. Distribution of developmental dental anomalies in a study group among male and Female were analyzed using Pearson's Chi square test. In the present study, the level of significance (α) was fixed at 5%. ($p \leq 0.05$).

For calculating the test statistic:-

The value of the test-statistic is:-

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} = N \sum_{i=1}^{n} p_i \left(\frac{O_i/N - p_i}{p_i} \right)^2$$

Where,

χ^2 = Pearson's cumulative test statistic, which asymptotically approaches a χ^2 distribution.

O_i = the numbers of observations of type *i*.

N = total number of observations

$E_i = Np_i$ = the expected (theoretical) frequency of type *i*, asserted by the null hypothesis that the fraction of type *i* in the population is p_i

n = the number of cells in the table.

RESULTS

RESULTS

Among the 1, 21,899 subjects (60,033 males and 61,866 females), after exclusion criteria a total of 94,507 subjects were included (46,337 males and 48170 females). A total of 5508 individuals (5.8 %) had developmental dental anomalies. The distribution of sex was 3151 males (57.2%) and 2357 females (42.79%). Data obtained was analyzed using Statistical package for Social Sciences (SPSS) software version 17.0. The prevalence rates of different developmental dental anomalies were assessed. Distribution of developmental dental anomalies in a study group among male and Female were analysed using Pearson's Chi square test. In the present study, the level of significance (α) was fixed at 5%. ($p \leq 0.05$).

Table 1 and Graph 1 show the distribution and prevalence of developmental dental anomalies in a study group of 94,507 individuals (46,337 males and 48,170 females) with p values from Chi square test.

Out of the total 94,507 individuals, 4303 subjects exhibited at least one anomaly, 1205 subjects showed two anomalies and no subjects displayed more than two anomalies. Table 2 and Graph 2 show the frequencies of dental anomalies exhibited in the total subjects. On intergroup comparison of the five study groups of dental anomalies selected, the prevalence of size anomalies was significantly higher than the prevalence rates of shape, structural, number and positional anomalies. Table 3 and Graph 3 shows the comparative analysis between different study groups of anomalies.

Microdontia was the most common (2.47%) anomaly among the whole study group followed by hyperdontia (1.75%) and peg shaped laterals (1.01%), while dentinogenesis imperfecta (0.01%) was the rarest anomaly, followed by amelogenesis imperfecta (0.02%) and macrodontia (0.04%) among patients visiting K.S.R. Institute of Dental Science &

Research, Tiruchengode, Tamilnadu (Table 3). *P* values indicated that the dental anomalies were statistically independent of sex (Table 1).

SHAPE ANOMALIES

Shape anomalies include Talon cusps, Dens evaginatus, Fusion and Peg shaped laterals. Dens evaginatus was observed in 34 males and 35 females (total 69 subjects), with a total prevalence of 0.07%, making it the rarest anomaly in this study group. The most common shape anomaly was peg shaped laterals and it is the third most frequent of all selected dental anomalies, with a prevalence of 1.01% in this study group. Of the 94,507 individuals, 555 male and 404 female subjects (total 959 subjects) had unilateral or bilateral peg-shaped teeth.

Table 4 and Graph 4 show the distribution and prevalence of peg-shaped lateral incisors.

After peg-shaped laterals, other common shape abnormalities were fusion with overall prevalence rate of 0.14% followed by talon cusps 0.11%.

Fusion was most common in mandibular lateral incisors, which showed unilateral occurrence in 128 out of 133 subjects. Table 5 and Graph 5 show the distribution and prevalence of fusion.

Talon cusps were most common in maxillary lateral incisors showed bilateral occurrence in 82 out of 105 subjects. Table 6 and Graph 6 show the distribution and prevalence of talon cusps. The overall prevalence of shape anomalies among 94,507 individuals were 1.33%.

SIZE ANOMALIES

Size anomalies include Microdontia and Macrodontia. Microdontia was observed in 1320 males and 1017 females (total 2337 subjects), with a total prevalence of 2.47%, making it as the common anomaly in this study group. Table 7 and Graph 7 show the distribution and prevalence of microdontia.

Macrodontia is the rarest in this group and it is the third most rarest anomaly among the whole study group. It was observed in a total of 41 individuals (23 males and 18 females) with an overall prevalence rate of 0.04%. Table 8 and Graph 8 show the distribution and prevalence of macrodontia. The overall prevalence of size anomalies among 94,507 individuals were 2.51%.

STRUCTURAL ANOMALIES

Structural anomalies include AI and DI. Structural anomalies were rare in comparison to other anomalies. The total prevalence of AI was 0.02%, and it was observed in 9 males and 10 females (total 19 subjects). Only 17 cases (total 7 males and 10 females) of DI were reported with a prevalence of 0.01% making it the rarest in this group and the whole study group.

Table 9 and Graph 9 show the distribution and prevalence of AI and DI.

The overall prevalence of structural anomalies among 94, 507 individuals were 0.03%.

NUMBER ANOMALIES

Number anomalies include hyperdontia and hypodontia. The most frequent tooth number anomaly was hyperdontia. The total prevalence of hyperdontia was 1.75%, making it the second most frequent of all developmental anomalies. When the distribution of hyperdontia in both the arches were evaluated, maxillary hyperdontia was most common

when compared to that of mandibular hyperdontia and in maxilla unilateral hyperdontia was most common when compared to that of bilateral hyperdontia (Table 1).

Table 10 and Graph 10 show the distribution and prevalence of hyperdontia.

The total prevalence of hypodontia was 0.07% and found that the maxillary lateral incisor was the most frequent missing tooth (excluding third molars) followed by mandibular central incisors, maxillary central incisors, maxillary premolars and mandibular premolars.

Table 11 and Graph 11 show the distribution and prevalence of hypodontia.

The overall prevalence of number abnormalities among 94, 507 individuals were 1.82%

POSITIONAL ANOMALIES

Positional anomalies include TP and TM. TP is more common when compared to that of TM in this study group. Out of 73 individuals (38 males and 35 females) 56 individuals (29 females and 27 males) showed unilateral TP. The overall prevalence rate of TP is 0.07%. Table 12 and Graph 12 show the distribution and prevalence of TP.

TM was the rarest among the positional anomalies and it was observed in 29 individuals (13 males and 16 females) with a prevalence rate of 0.03%. Bilateral TM is more common when compared with that of unilateral TM and was observed in 26 individuals out of 29 (14 females and 12 males). Table 13 and Graph 13 show the prevalence and distribution of TM. The overall prevalence rate of positional anomalies among 94, 507 were 0.10%.

TABLE 1: DISTRIBUTION AND PREVALENCE OF DEVELOPMENTAL DENTAL ANOMALIES IN A STUDY GROUP OF 94, 507 INDIVIDUALS (46,337 MALES AND 48,170 FEMALES) WITH *P* VALUES FROM CHI SQUARE TEST

Dental Anomalies	Female (n=48170)	Male (n=46337)	Total (n=94507)	Female (n%)	Male (n%)	Total (n%)	Level of significance p value
Unilateral Microdontia	744	996	1740	1.50	2.10	1.80	0.000
Bilateral Microdontia	273	324	597	0.60	0.70	0.60	0.010
Unilateral Talon Cusps	8	15	23	0.00	0.00	0.00	0.120
Bilateral Talon Cusps	32	50	82	0.10	0.10	0.10	0.031
Unilateral Dens Evaginatus	5	6	11	0.00	0.00	0.00	0.714
Bilateral Dens Evaginatus	30	28	58	0.10	0.10	0.10	0.908
Unilateral Fusion	48	80	128	0.10	0.20	0.10	0.002
Bilateral Fusion	2	3	5	0.00	0.00	0.00	0.624
Unilateral Peg Laterals	83	102	185	0.20	0.20	0.20	0.096
Bilateral Peg Laterals	321	453	774	0.70	1.00	0.80	0.000
Hypodontia Maxillary Central Incisor	4	6	10	0.00	0.00	0.00	0.488
Hypodontia Maxillary Lateral Incisor	11	14	25	0.00	0.00	0.00	0.486
Hypodontia Mandibular Central Incisor	3	8	11	0.00	0.00	0.00	0.116
Hypodontia Maxillary Premolar	5	6	11	0.00	0.00	0.00	0.714
Hypodontia Mandibular Premolar	3	4	7	0.00	0.00	0.00	0.668
Hypodontia Maxillary Molar	3	2	5	0.00	0.00	0.00	0.686
Hypodontia Mandibular Molar	1	0	1	0.00	0.00	0.00	0.327
Hyperdontia Maxillary Unilateral	281	421	702	0.60	0.90	0.70	0.001
Hyperdontia Maxillary Bilateral	75	82	157	0.20	0.20	0.20	0.422
HyperdontiaMandibular Unilateral	263	384	647	0.50	0.80	0.70	0.001
Hyperdontia Mandibular Bilateral	73	77	150	0.20	0.20	0.20	0.572
Amelogenesis Imperfecta	10	9	19	0.00	0.00	0.00	0.885
Dentinogenesis	10	7	17	0.00	0.00	0.00	0.517

Imperfecta							
Transposition Unilateral	29	27	56	0.10	0.10	0.10	0.903
Transposition Bilateral	6	11	17	0.00	0.00	0.00	0.196
Transmigration Unilateral	2	1	3	0.00	0.00	0.00	0.587
Transmigration bilateral	14	12	26	0.00	0.00	0.00	0.769
Macrodontia Unilateral	4	6	10	0.00	0.00	0.00	0.488
Macrodontia Bilateral	14	17	31	0.00	0.00	0.00	0.518

GRAPH 1: DISTRIBUTION AND PREVALENCE OF DEVELOPMENTAL DENTAL ANOMALIES IN A STUDY GROUP OF 94,507 INDIVIDUALS (46,337 MALES AND 48,170 FEMALES)

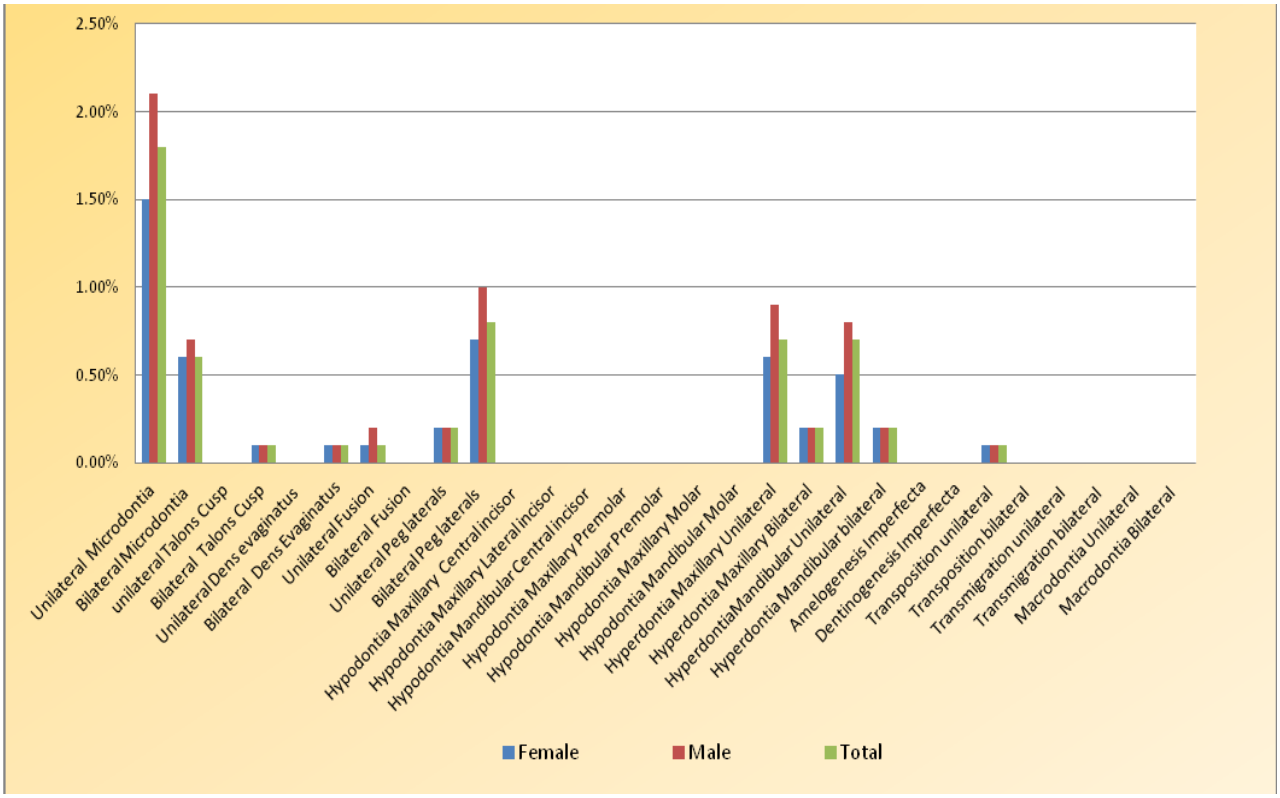


TABLE 2: FREQUENCIES OF DENTAL ANOMALIES EXHIBITED IN THE TOTAL SUBJECTS

Variables	Total (94,507) n (%)
At least one anomaly	4303 (4.55%)
Two anomalies	1205 (1.27%)
> Two anomalies	0 (0%)
Total subjects with dental anomalies	5508 (5.83%)

GRAPH 2: FREQUENCIES OF DENTAL ANOMALIES EXHIBITED IN THE TOTAL SUBJECTS

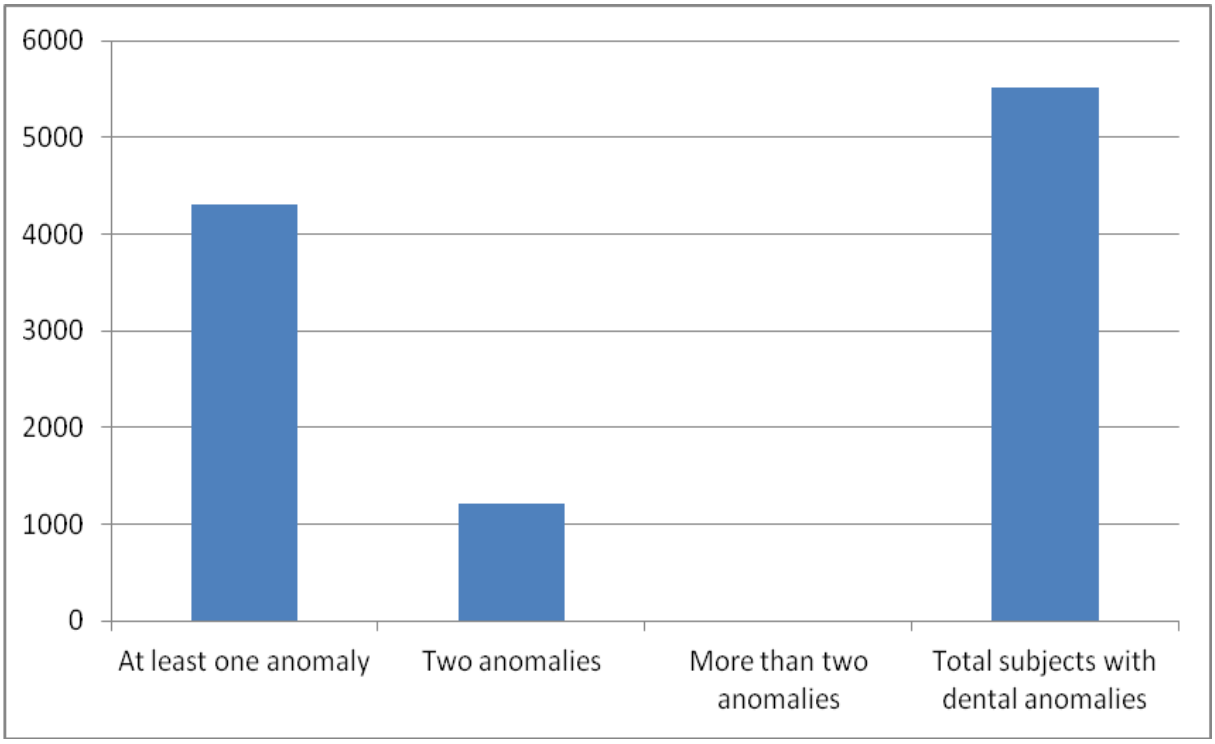


TABLE 3: COMPARITIVE ANALYSIS BETWEEN DIFFERENT STUDY GROUPS OF ANOMALIES IN A STUDY GROUP OF 94,507 INDIVIDUALS (46,337 MALES AND 48,170 FEMALES)

Dental Anomalies	Total	Total Prevalence %	Male	Male Prevalence %	Female	Female Prevalence %
Shape Anomalies	**1266**	**1.33**	**737**	**1.59**	**529**	**1.09**
Talons Cusp	105	0.11	65	0.14	40	0.08
Dens Evaginatus	69	0.07	34	0.07	35	0.07
Fusion	133	0.14	83	0.17	50	0.10
Peg Shaped Laterals	959	1.01	555	1.19	404	0.83
Size Anomalies	**2378**	**2.51**	**1345**	**2.90**	**1035**	**2.14**
Microdontia	2337	2.47	1320	2.84	1017	2.11
Macrodontia	41	0.04	23	0.05	18	0.03
Structural Anomalies	**36**	**0.03**	**16**	**0.03**	**20**	**0.04**
Amelogenesis Imperfecta	19	0.02	9	0.01	10	0.02
Dentinogenesis Imperfecta	17	0.01	7	0.01	10	0.02
Number Anomalies	**1726**	**1.82**	**1004**	**2.16**	**722**	**1.49**
Hypodontia	70	0.07	40	0.08	30	0.06
Hyperdontia	1656	1.75	964	2.08	692	1.43
Positional anomalies	**102**	**0.10**	**51**	**0.11**	**51**	**0.10**
Transposition	73	0.07	38	0.08	35	0.07
Transmigration	29	0.03	13	0.02	16	0.03
Total	5508	5.83	3151	6.80	2357	4.89

GRAPH 3: COMPARITIVE ANALYSIS BETWEEN DIFFERENT STUDY GROUPS OF ANOMALIES IN A STUDY GROUP OF 94,507 INDIVIDUALS (46,337 MALES AND 48,170 FEMALES)

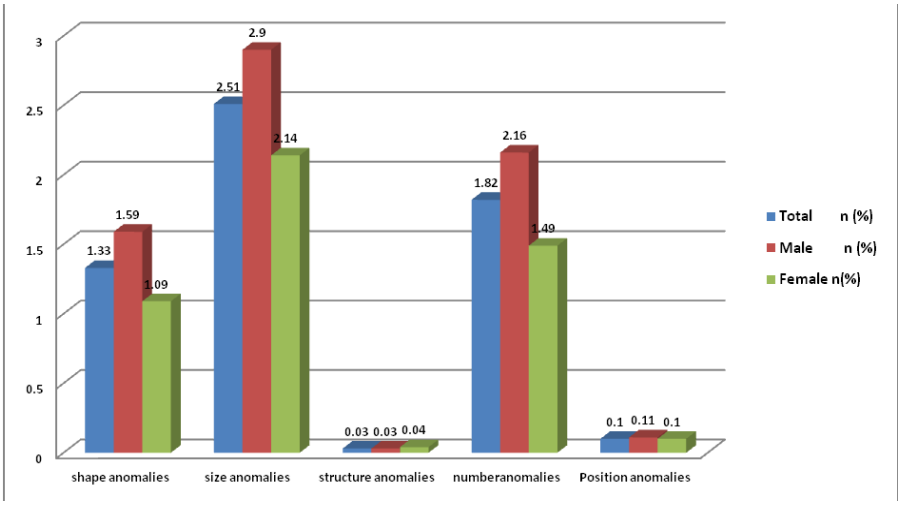


TABLE 4: DISTRIBUTION AND PREVALENCE OF PEG-SHAPED LATERALS IN MAXILLARY LATERAL INCISORS

	Unilateral n (%)	Bilateral n (%)	Total n (%)
Male (46,337)	102 (0.22%)	453 (0.97%)	555 (1.19%)
Female (48,170)	83 (0.17%)	321 (0.66%)	404 (0.83%)
Total (94,507)	185 (0.19%)	774 (0.81%)	959 (1.01%)
***P* value**	0.096	0.000	

GRAPH 4: DISTRIBUTION AND PREVALENCE OF PEG-SHAPED LATERALS IN MAXILLARY LATERAL INCISORS

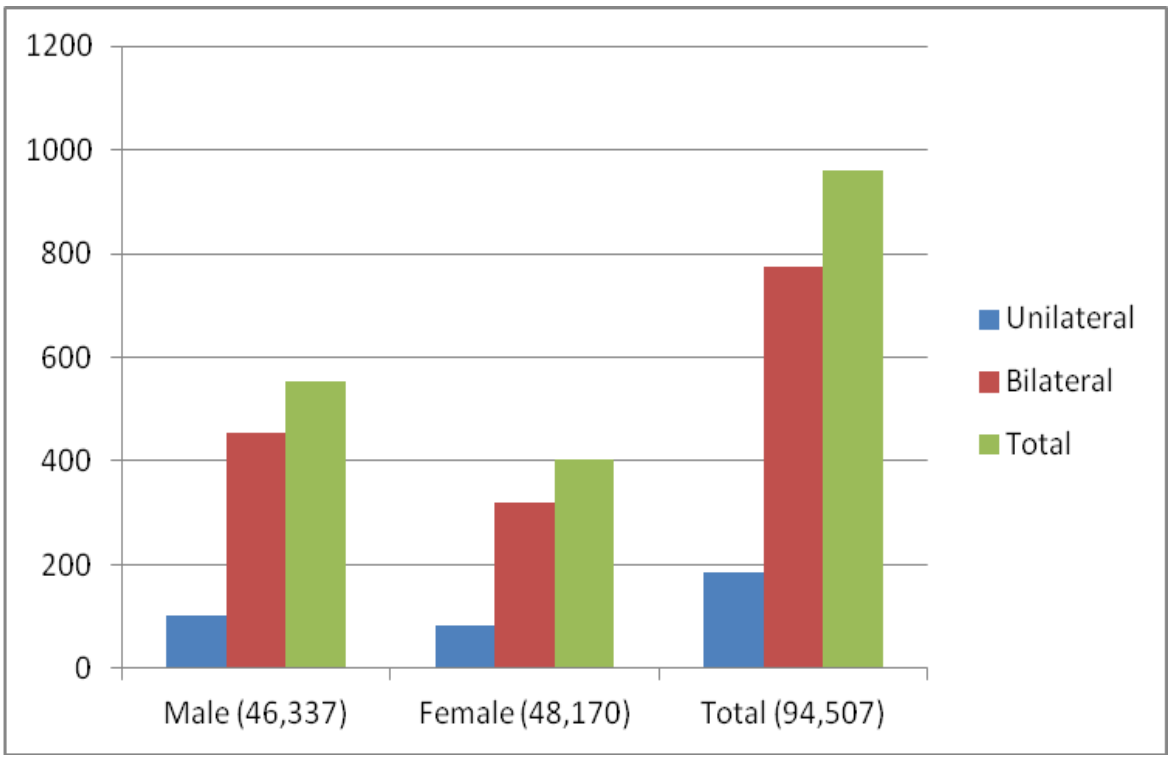


TABLE 5: DISTRIBUTION AND PREVALENCE OF FUSION

	Unilateral n (%)	**Bilateral n (%)**	**Total n (%)**
Male (46,337)	80 (0.17%)	3 (0.006%)	83 (0.17%)
Female (48,170)	48 (0.09%)	2 (0.004%)	50 (0.10%)
Total (94,507)	128 (0.13%)	5 (0.005%)	133 (0.14%)
***P* value**	0.002	0.624	

GRAPH 5: DISTRIBUTION AND PREVALENCE OF FUSION

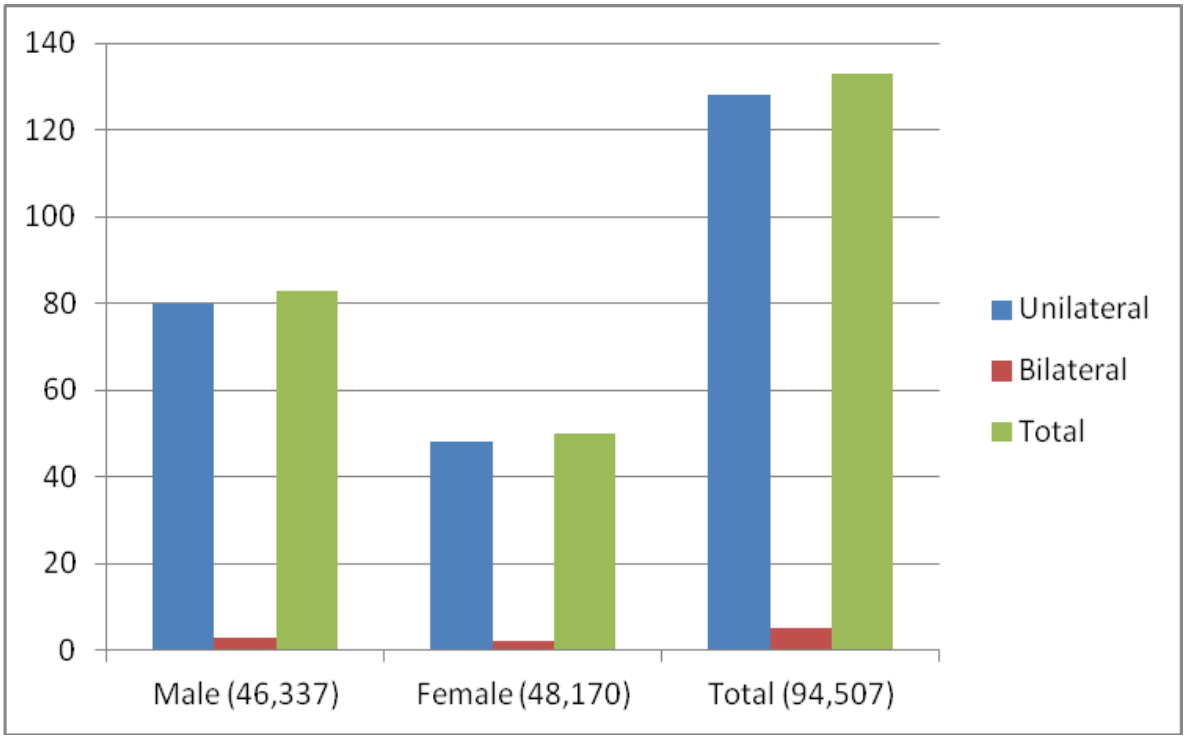


TABLE 6: PREVALENCE AND DISTRIBUTION OF TALON CUSPS

	Unilateral n (%)	**Bilateral n (%)**	**Total n (%)**
Male (46,337)	15 (0.03%)	50 (0.10%)	65 (0.14%)
Female (48,170)	8 (0.01%)	32 (0.06%)	40 (0.08%)
Total (94,507)	23 (0.02%)	82 (0.08%)	105 (0.11%)
***P* value**	0.120	0.031	

GRAPH 6: PREVALENCE AND DISTRIBUTION OF TALON CUSPS

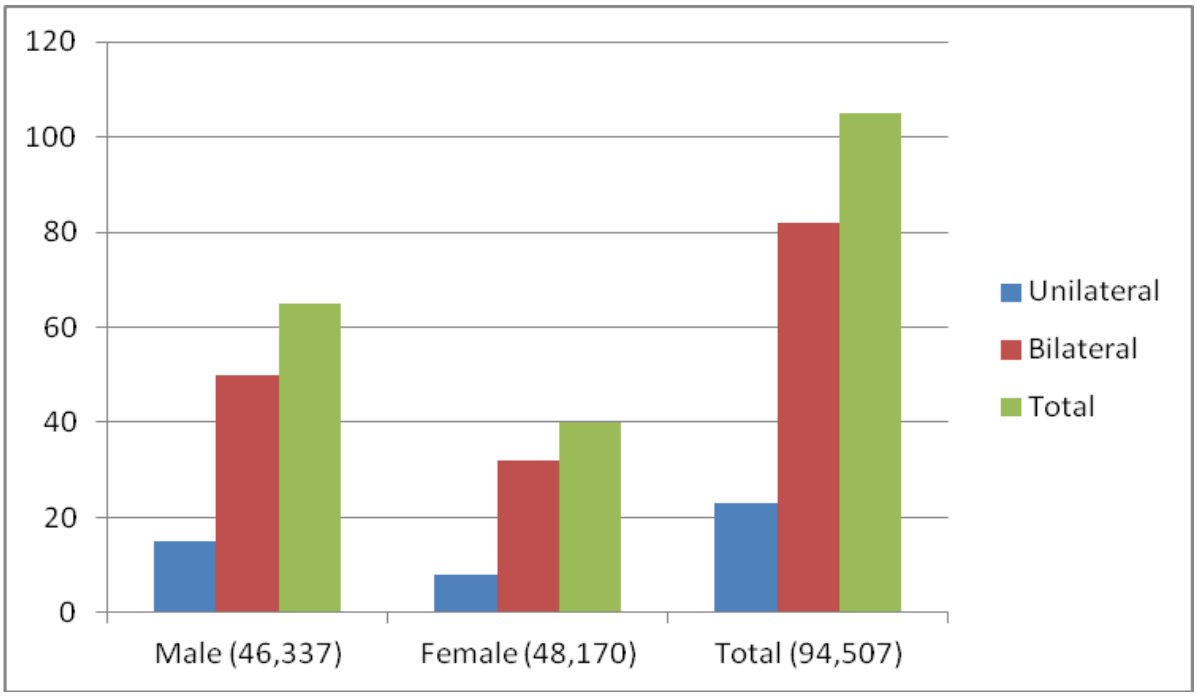


TABLE 7: DISTRIBUTION AND PREVALENCE OF MICRODONTIA

	Unilateral n (%)	**Bilateral n (%)**	**Total n (%)**
Male (46,337)	996 (2.14%)	324 (0.69%)	1320 (2.84%)
Female (48,170)	744 (1.54%)	273 (0.56%)	1017 (2.11%)
Total (94,507)	1740 (1.84%)	597 (0.63%)	2337 (2.47%)
***P* value**	0.000	0.010	

GRAPH 7: DISTRIBUTION AND PREVALENCE OF MICRODONTIA

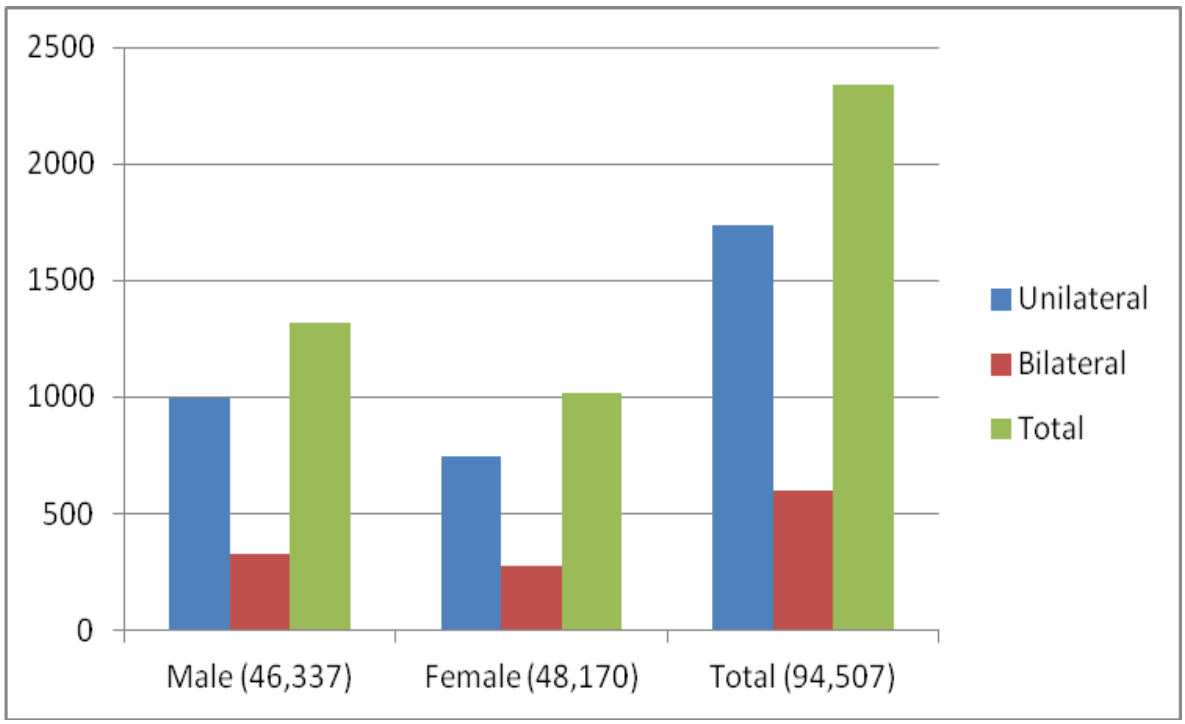


TABLE 8: DISTRIBUTION AND PREVALENCE OF MACRODONTIA

	Unilateral n (%)	**Bilateral n (%)**	**Total n (%)**
Male (46,337)	6 (0.01%)	17 (0.03%)	23 (0.04%)
Female (48,170)	4 (0.008%)	14 (0.02%)	18 (0.03%)
Total (94,507)	10 (0.01%)	31 (0.03%)	41 (0.04%)
***P* value**	0.488	0.518	

GRAPH 8: DISTRIBUTION AND PREVALENCE OF MACRODONTIA

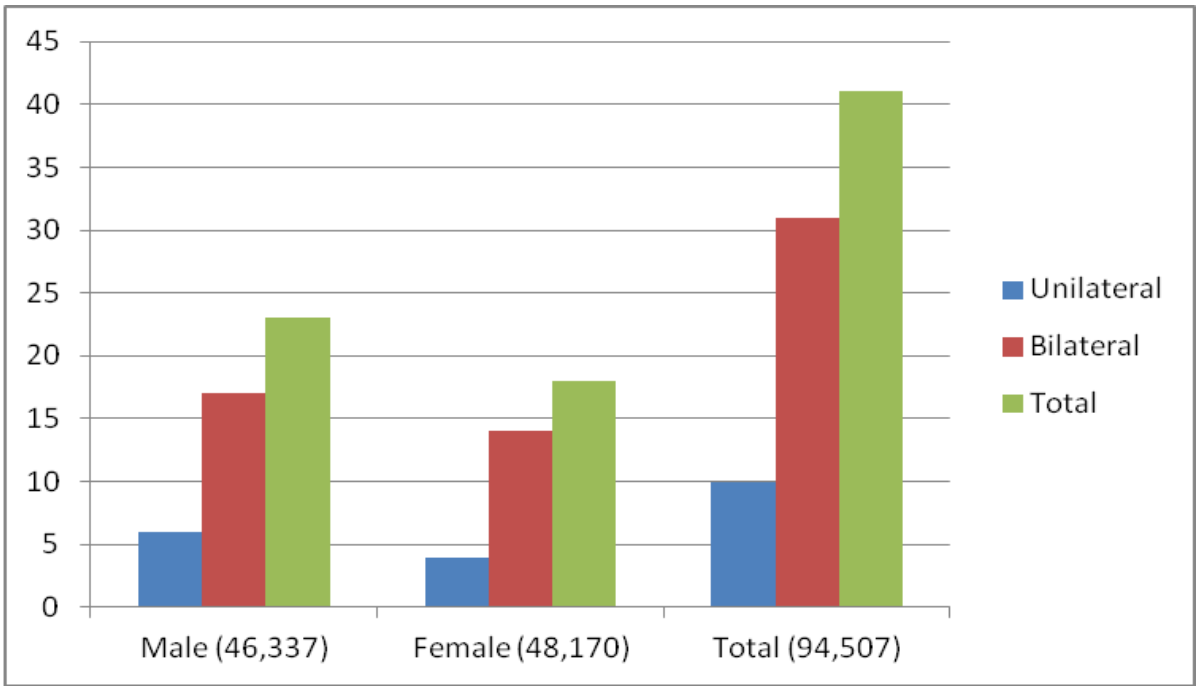


TABLE 9: DISTRIBUTION AND PREVALENCE OF STRUCTURAL ANOMALIES

	AI n (%)	DI n (%)	Total n (%)
Male (46,337)	9 (0.01%)	7 (0.01%)	16 (0.03%)
Female (48,170)	10 (0.02%)	10 (0.02%)	20 (0.04%)
Total (94,507)	19 (0.02%)	17 (0.01%)	36 (0.03%)
***P* value**	0.885	0.517	

GRAPH 9: DISTRIBUTION AND PREVALENCE OF STRUCTURAL ANOMALIES

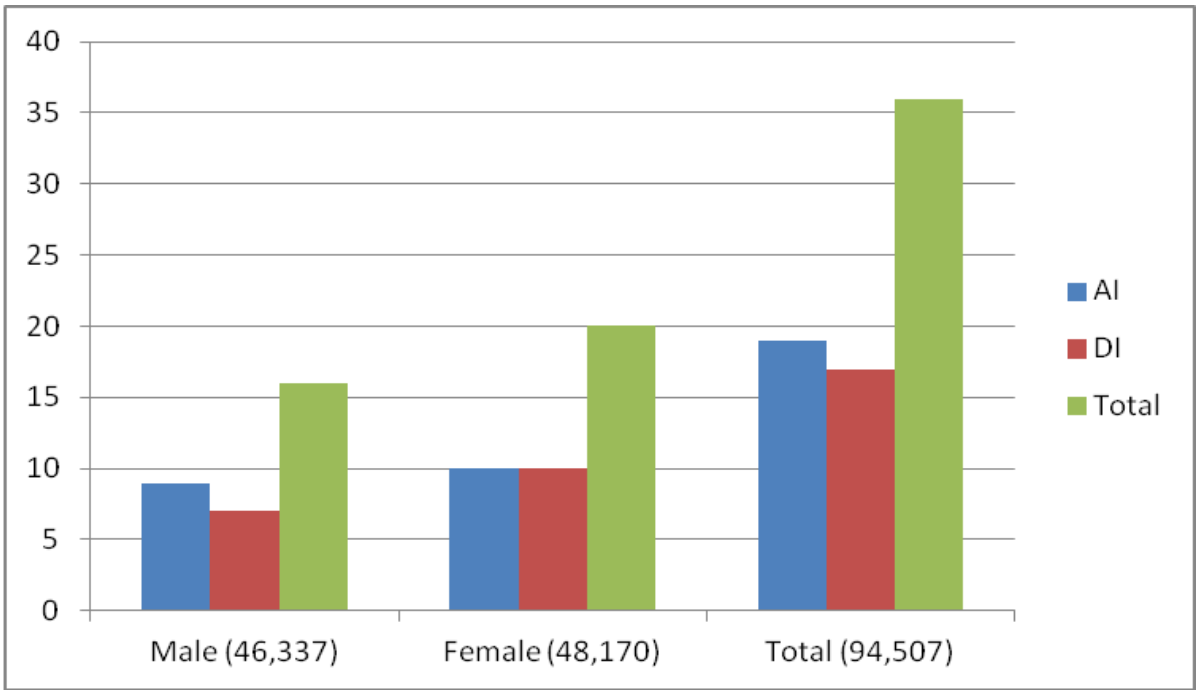


TABLE 10: DISTRIBUTION AND PREVALENCE OF HYPERDONTIA

	Hyperdontia Max Unilateral n (%)	Hyperdontia Max Bilateral n (%)	Hyperdontia Man Unilateral n (%)	Hyperdontia Man Bilateral n (%)	Total n (%)
Male (46,337)	421 (0.90%)	82 (0.17%)	384 (0.82%)	77 (0.16%)	964 (2.08%)
Female (48,170)	281 (0.58%)	75 (0.15%)	263 (0.54%)	73 (0.15%)	692 (1.43%)
Total (94,507)	702 (0.74%)	157 (0.16%)	647 (0.68%)	150 (0.15%)	1656 (1.75%)
***P* value**	0.001	0.422	0.001	0.572	

GRAPH 10: DISTRIBUTION AND PREVALENCE OF HYPERDONTIA

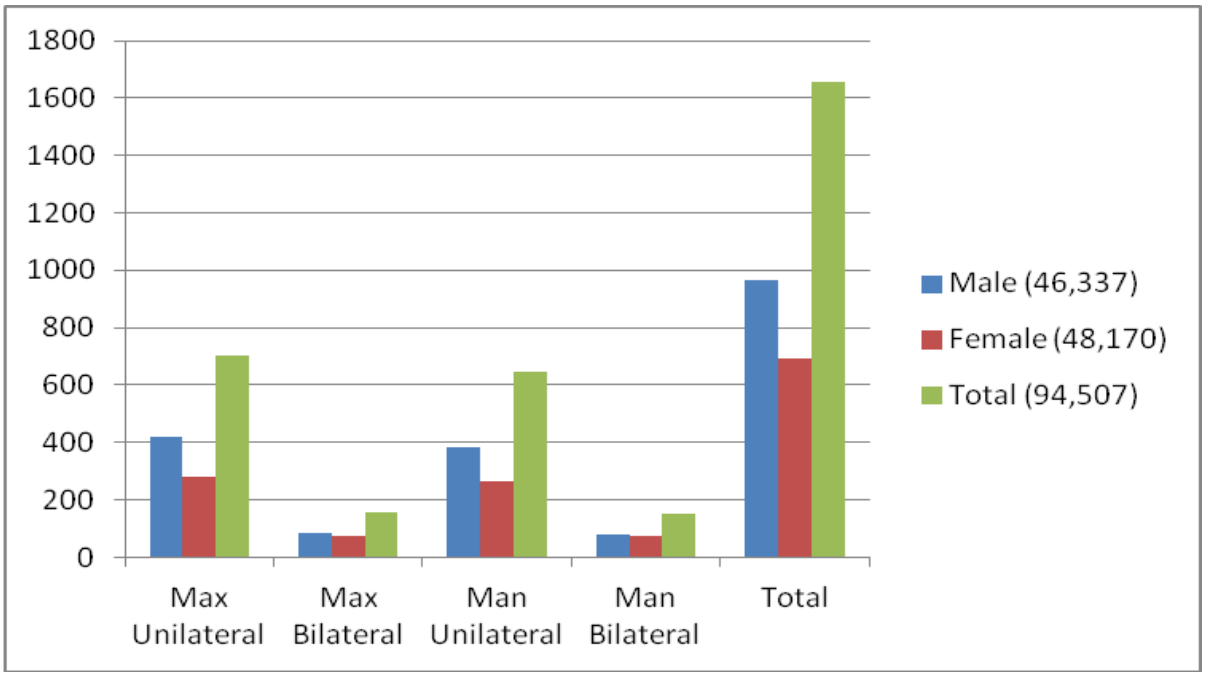


TABLE 11: PREVALENCE AND DISTRIBUTION OF HYPODONTIA

Hypodontia	Male (46,337) n (%)	Female (48,170) n (%)	Total (94,507) n (%)	*P* value
Maxillary Central incisor	6 (0.01%)	4 (0.008%)	10 (0.01%)	0.488
Maxillary Lateral incisor	14 (0.03%)	11 (0.02%)	25 (0.02%)	0.486
Mandibular Central incisor	8 (0.01%)	3 (0.006%)	11 (0.01%)	0.116
Maxillary Premolar	6 (0.01%)	5 (0.01%)	11 (0.01%)	0.714
Mandibular Premolar	4 (0.008%)	3 (0.006%)	7 (0.007%)	0.668
Maxillary Molar	2 (0.004%)	3 (0.006%)	5 (0.005%)	0.686
Mandibular Molar	0 (0%)	1 (0.002%)	1 (0.001%)	0.327

GRAPH 11: DISTRIBUTION AND PREVALENCE OF HYPODONTIA

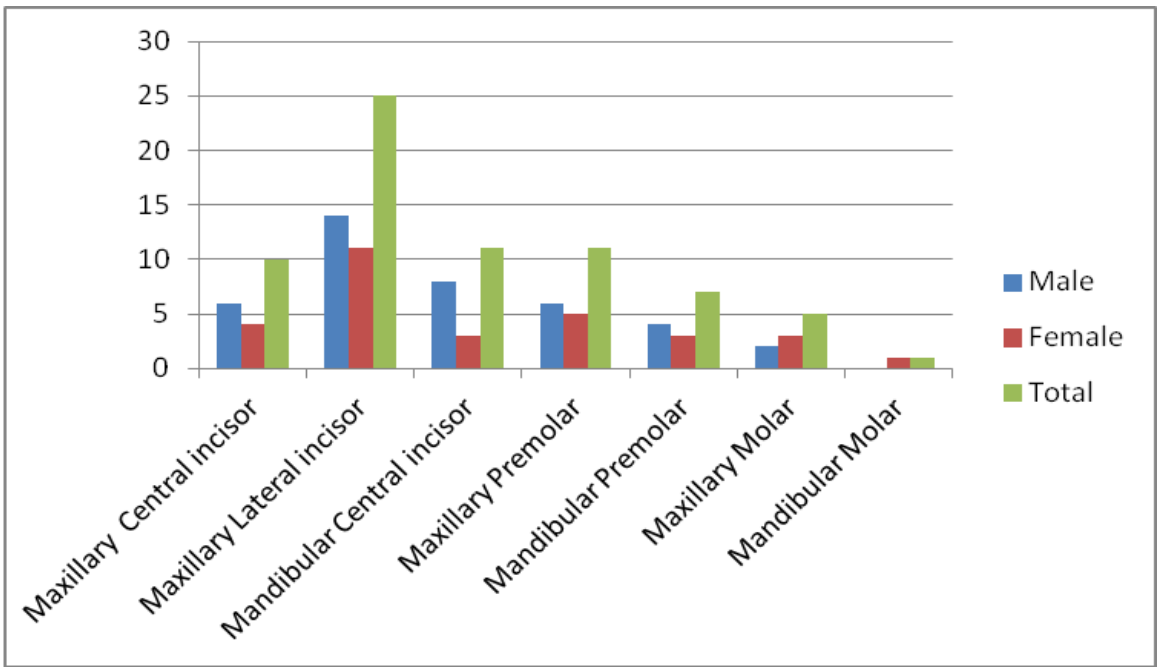


TABLE 12: DISTRIBUTION AND PREVALENCE OF TRANSPOSITION

	Unilateral n (%)	**Bilateral n (%)**	**Total n (%)**
Male (46,337)	27 (0.05%)	11 (0.02%)	38 (0.08%)
Female (48,170)	29 (0.06%)	6 (0.01%)	35 (0.07%)
Total (94,507)	56 (0.05%)	17 (0.01%)	73 (0.07%)
***P* value**	0.903	0.196	

GRAPH 12: DISTRIBUTION AND PREVALENCE OF TRANSPOSITION

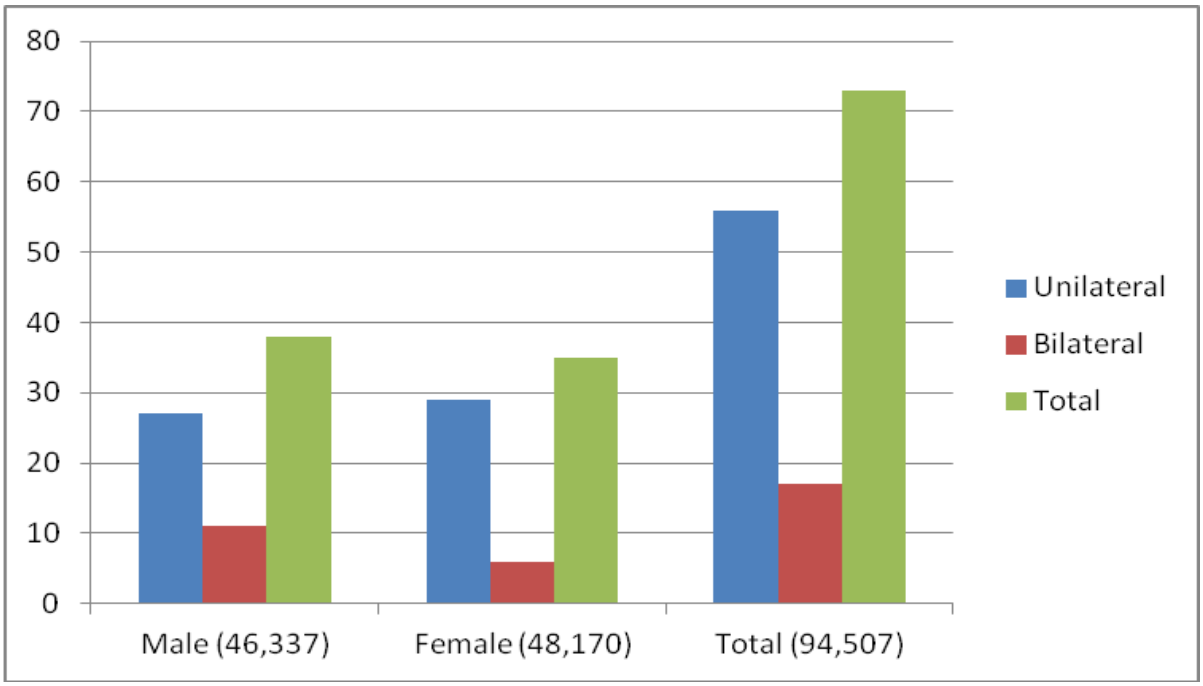
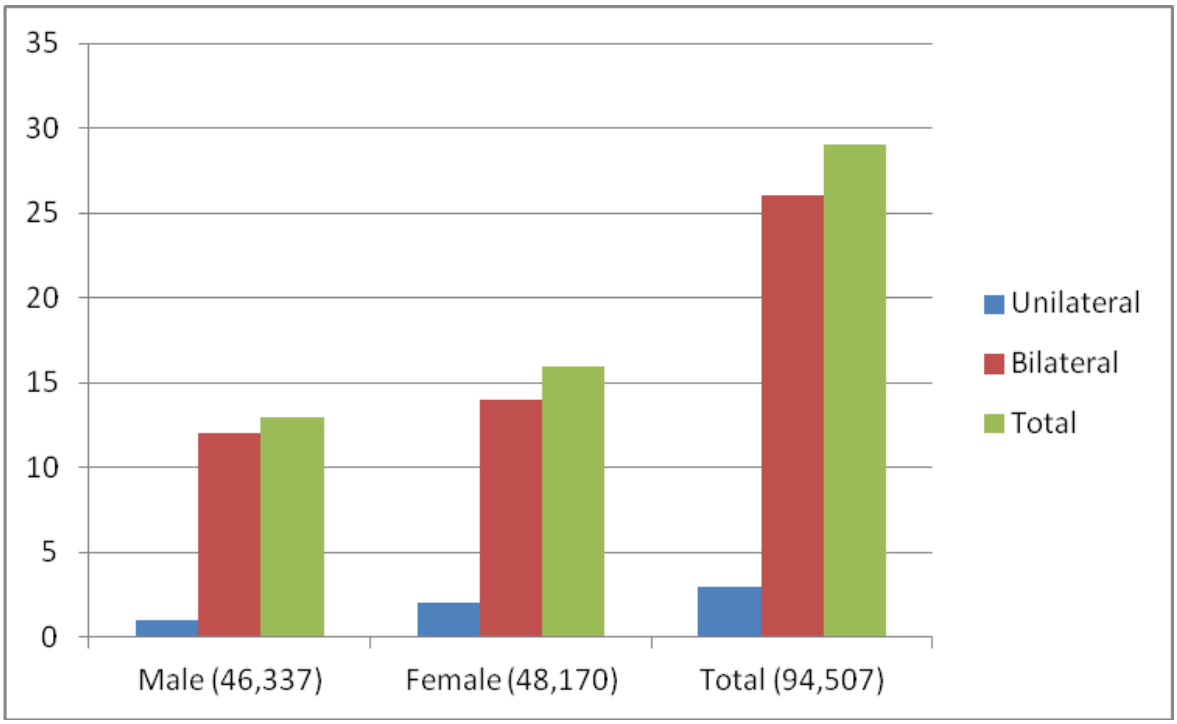


TABLE 13: DISTRIBUTION AND PREVALENCE OF TRANSMIGRATION

	Unilateral n (%)	Bilateral n (%)	Total n (%)
Male (46,337)	1 (0.002%)	12 (0.02%)	13 (0.02%)
Female (48,170)	2 (0.004%)	14 (0.02%)	16 (0.03%)
Total (94,507)	3 (0.003%)	26 (0.02%)	29 (0.03%)
***P* value**	0.587	0.769	

GRAPH 13: DISTRIBUTION AND PREVALENCE OF TRANSMIGRATION



DISCUSSION

DISCUSSION

Although so many researchers have studied the prevalence of dental anomalies, only limited studies have statistically analyzed the prevalence and distribution of various developmental dental anomalies in Indian population. There was a significant difference between the prevalence of dental anomalies observed in previous epidemiological studies and the present study. A significant difference and correlations were also observed in the prevalence of similar anomalies between the present study and the study by **Guttal et al. (2010)** [26] and **Saurabh K. Gupta et al. (2011)** [27] in Indian population. The dissimilarity can be attributed to the differences in inclusion criteria, exclusion criteria, sampling techniques and study design.

SIZE ANOMALIES

In my study size anomalies constituted the most dominant group in occurrence. Microdontia and macrodontia were included in the group of size anomalies. Out of the 5508 subjects with dental anomalies, 2378 exhibited size anomalies with an overall prevalence of 2.51%. Microdontia were the most prevalent in the whole group study. In a study conducted by **Tsai and King et al. (1998)** [7] in the Southern Chinese population the second most prevalent dental anomaly was microdontia and it constituted around 6.9% of the total population. Similar study which was conducted by **Thongudomporn et al. (1998)** [29] among orthodontic patients and found that microdontia is the most prevalent dental anomaly and accounts for about 9.9% among all other developmental dental anomalies. Another study conducted by **Ghaznawi et al (1998)** [8] among Saudi Arabian population and found microdontia is the most prevalent developmental dental anomaly and constitutes for about 53.3% of the total population which were included in the study group. In India **Guttal et al.**

(2010) [26] and **Gupta et al. (2011)** [27] conducted similar studies and the prevalence of microdontia were 0.16% and 2.58% respectively. According to **Guttal et al.**[26] microdontia is the second prevalent developmental dental anomaly among Indian population whereas it is the most prevalent developmental dental anomaly by **Gupta et al.** [27] In my study also the most prevalent dental anomaly was microdontia and correlates well with the study conducted by **Gupta et al.** [27] among Indian population and accounts for about 2.47% of the total subjects included in the study group with a male prevalence of 2.84% and a female prevalence of 2.11%. None of the study shows the prevalence of dental anomalies among males and females separately. In my study the prevalence of microdontia among males are more when compared to that of females.

The third rarest developmental dental anomaly was macrodontia which accounts for only 0.04% among all developmental dental anomalies and it were included in the group of size anomalies were microdontia constitutes the most common developmental anomaly in that group. None of the other studies included macrodontia as a separate entity. In my study out of 5508 subjects with dental anomalies only 41 individuals show macrodontia with a prevalence of 0.05% in males and 0.03% in females made it as the third rarest among the whole individuals with developmental dental anomalies.

SHAPE ANOMALIES

The third most dominant group in my study was shape anomalies and exhibited a prevalence rate of 1.33% among the whole subjects included in the study. Four anomalies were considered in shape anomalies group which includes talon cusps, dens evaginatus, fusion and peg-shaped lateral incisors. Among all these peg-shaped lateral incisors were the most prevalent among shape anomalies. All other authors included peg-shaped lateral incisors

in the group of microdontia whereas in a study by **Gupta et al. (2011)** [27] among Indian population included peg-shaped lateral alone as microdontia with a prevalence rate of 2.58% of the total subjects and that was the most prevalent developmental dental anomaly in that study group. According to the study conducted by **Proffit et al. (1997)** [30] mentioned that the most common abnormality is variation in size, particularly in the maxillary lateral incisors. The prevalence of this condition ranges from 0.8% to 8.4% in various populations. In my study, peg-shaped lateral incisor was included as a separate anomaly among the group of shape anomalies with an overall prevalence rate of 1.01%. The prevalence among male subjects was 1.19% and in female subjects were 0.83% and this result correlates well with the study conducted by **Proffit et al.** [30]

According to **Dash JK et al. (2004)** [31] the prevalence of talon cusp ranges from 1% to 8% of the population with a higher frequency in males than in females. The anomaly has a greater predilection for maxilla when compared to mandible and maxillary lateral incisors are commonly affected in the permanent dentition followed by central incisors and canines. According to the study in Indian population by **Guttal et al. (2010)** [26] the prevalence of talon cusps was 0.07% and according to **Gupta et al. (2011)** [27] the prevalence of talon cusps was 0.97%. In the present study the prevalence of talon cusps was 0.11% with a male prevalence of 0.14% and female prevalence of 0.08%. My study correlates well with the study conducted by **Dash JK et al.** [31] in 2004 and **Guttal et al.** [26] in 2010.

Dens evaginatus primarily affects the premolars but can also occur in molars, canines, and incisors. In premolars and in molars, the anomaly usually affects the occlusal surface. In my study, dens evaginatus comprised 0.07% of the total dental anomalies and shows a significant difference between the other two studies conducted by **Guttal et al. (2010)** [26] and

Gupta et al. (2011) [27] in Indian population. None of the other studies shows the prevalence of dens evaginatus separately.

In a study conducted by **Olivan-Rosas G et al. (2004)** [32] fusion can range from 0.5% to 5% in prevalence based on geographic, racial or genetic factors. According to the study conducted by **Altug-Atac et al. (2007)** [2] among Turkish population the overall prevalence of fusion was 0.23%. Another study by **Backman et al. (2001)** [33] in Sweden population shows the prevalence of fusion was 0.3% which was very minimal. In Indian population **Guttal et al. (2010)** [26] and **Gupta et al. (2011)** [27] conducted similar studies and shows the prevalence of fusion was 0.08% and 0.27% respectively. In my study the prevalence of fusion was 0.14% with a male prevalence of 0.17% and a female prevalence of 0.10%. There is a significant difference between the above said studies and my study.

NUMBER ANOMALIES

In my study the second most dominant group in occurrence was number anomalies with an overall prevalence rate of 1.82%. Hyperdontia and hypodontia were included in the group of number anomalies. Out of 5508 subjects 1726 shows either hypodontia or hyperdontia. Hyperdontia were the most prevalent among number anomalies. **Zhu et al (1996)** [34] conducted a study in Turkish population and found that the prevalence of hyperdontia was 1% to 3% which was most prevalent among them. None of the other studies shows a high prevalence rate in hyperdontia except the two other similar studies conducted in Indian population by **Guttal et al. (2010)** [26] and **Gupta et al. (2011).** [27] According to **Guttal et al.** [26] the most prevalent developmental dental anomaly was hyperdontia which accounts for about 0.43% and according to **Gupta et al.** [27] the third most prevalent developmental dental anomaly was hyperdontia and constitutes for about 2.40%. In the

present study the prevalence of hyperdontia was 1.75% with a male prevalence of 2.08% and a female prevalence of 1.43% shows that males are more prone for getting hyperdontia when compared to that of females. So my study correlates well with the study conduted by **Zhu et al** [34] in 1996 and also there were no significant difference between the study conducted by **Gupta et al.** [27] and **Guttal et al.** [26]

According to the studies conducted by **Altug-Atac et al. (2005)** [2] and **Uslu et al. (2009)** [35] in Turkish population, **Backman et al. (2001)** [33] in Sweden population and **Gupta et al. (2011)** [27] in Indian population hypodontia was the most prevalent developmental dental anomaly in their study group with an overall prevalence of 2.63%, 21.6%, 8.4% and 4.19% respectively. In a study by **Ghaznawi et al. (1999)** [8] in Saudi population hypodontia was the second most common developmental dental anomaly with a prevalence of 8.4%. But according to **Guttal et al. (2010)** [26] in Indian population the prevalence of hypodontia was only 0.15%. In my study the prevalence of hypodontia was 0.07% with a male prevalence of 0.08% and female prevalence of 0.06% which shows a minimal correlation with the study conducted by **Guttal et al.** [26] in the year 2010 and shows a significant difference between the other studies conducted by various authors.

STRUCTURAL ANOMALIES

Structural anomalies were the rarest in occurrence with an overall prevalence rate of 0.03%. Amelogenesis imperfecta and dentinogenesis imperfecta were included in this group. According to the studies conduted by various authors such as **Thongudomporn (1998),** [29] **Uslu (2009),** [35] **Ghaznawi (1999),** [8] **Ezoddini (2009),** [18] **Backman (2001)** [33] and also by

the Indian author **Guttal (2010)** [26] not a single case of structural anomaly were reported in their studies in limited samples. In a study conducted by **Altug-Atac et al. (2005)** [2] among Turkish population amelogenesis imperfecta were having a total prevalence of 0.43% and that was the third most common developmental dental anomaly among that population, which shows a significant difference between the study conducted by me. But according to **Gupta et al. (2011)** [27] the prevalence of amelogenesis imperfecta were 0.27% and that of dentinogenesis imperfecta were 0.09% which made dentinogenesis imperfecta the rarest among that population. A similar result was obtained in my study with the prevalence rate of amelogenesis imperfecta was 0.02% and that of dentinogenesis imperfecta was 0.01% made dentinogenesis imperfecta the rarest among all the developmental dental anomalies and the second most rarest was amelogenesis imperfecta. The result is very much significant that of the study conducted in Indian population by **Gupta et al.** [27] in 2011. The prevalence rate of amelogenesis imperfecta and dentinogenesis imperfecta among males and females are same and was 0.01% and 0.02% respectively.

POSITIONAL ANOMALIES

Positional anomalies comprise the second rarest group of anomalies after structural anomalies with an overall prevalence rate of 0.10%. In my study transposition and transmigration were included in the group of positional anomalies. None of the other studies in the literature included transposition and transmigration in position anomalies. In my study the overall prevalence of transposition was 0.07% with a male prevalence of 0.08% and female prevalence of 0.07%. The overall prevalence of transmigration was 0.03% with a male prevalence of 0.02% and female prevalence of 0.03% made transposition as the rarest among the group of positional anomalies when compared to that of transmigration. According to my

study the prevalence of males for transposition is greater when compared to that of females and the prevalence for transmigration is greater in females when compared to that of males.

The prevalence rates reported by several authors in different populations are given in table 14.

TABLE 14: PREVALENCE OF VARIOUS DENTAL ANOMALIES REPORTED BY PREVIOUS STUDIES IN DIFFERENT POPULATIONS

Authors	**Thongudomporn et al.** [29]	**Altug-Atac et al.** [2]	**Uslu et al.** [35]	**Ghaznawi et al.** [8]	**Ezoddini et al.** [18]	**Backman et al.** [33]	**Guttal et al.** [26]	**Gupta et al.** [27]	**Present study**
Sample Size	**111 Orthodontic patients**	**3043 Subjects**	**900 Orthodontic patients**	**1010 Subjects**	**480 Subjects**	**739 Subjects**	**20182 Subjects**	**1123 Subjects**	**94507 subjects**
Population & Year of study	**Queensland (1998)**	**Turkey (2005)**	**Turkey (2009)**	**Saudi Arabia (1999)**	**Iran (2009)**	**Sweden (2001)**	**Indian (2010)**	**Indian (2011)**	**Indian (2015)**
Size Anomalies									
Microdontia	9.9	1.58	0.7	53.3		0.8	0.16	2.58	2.47
Macrodontia									0.04
Shape Anomalies									
Talon cusp							0.07	0.97	0.11
Dens evaginatus			6.2				0.05	2.40	0.07
Fusion		0.23			0.2	0.3	0.08	0.27	0.14
Peg-shaped lateral incisors									1.01
Number Anomalies									
Hyperdontia	1.8	0.36	0.3	1.19	3.5	1.9	0.43	2.40	1.75
Hypodontia	8.1	2.63	21.6	9.41		8.4	0.15	4.19	0.07
Structural Anomalies									
Amelogenesis Imperfecta		0.43						0.27	0.02
Dentinogenesis Imperfecta								0.09	0.01
Positional Anomalies									
Transposition									0.07
Transmigration									0.03
Total	**74.7**	**5.05**	**40.3**		**40.8**		**1.73**	**34.28**	**5.83**

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

A total of 1, 21,899 subjects (60,033 males and 61,866 females) were examined. After exclusion criteria a total of 94,507 subjects were included (46,337 males and 48170 females). A total of 5508 individuals (5.8 %) had developmental dental anomalies. The distribution of sex was 3151 males (57.2%) and 2357 females (42.79%). The total prevalence of dental anomalies was 5.83% with a male prevalence of 6.80% and female prevalence of 4.89%. So according to my study the prevalence of dental anomalies are more in males than in females among patients visiting K.S.R. Institute of Dental Science and Research, Tiruchengode, Tamilnadu.

Within the limitations of this study, it was found that:

1) Only a minimum number of individuals had developmental dental anomalies among patients visiting K.S.R. Institute of Dental Science and Research, Tiruchengode, Tamilnadu. (5.83%)
2) Size anomalies were the most prevalent among all other developmental dental anomalies and accounts for about 2.51% in that microdontia comprises of 2.47% and macrodontia comprises of 0.04%.
3) Structural anomalies were the rarest among all other developmental dental anomalies and accounts for about only 0.03% in which dentinogenesis imperfecta comprises of 0.01% and amelogenesis imperfecta comprises of 0.02% made dentinogenesis imperfecta as the rarest among all other developmental dental anomalies.
4) Distribution of dental anomalies are more prevalent in males when compared to that of females in almost all the cases except in structural anomalies including amelogenesis imperfecta and dentinogenesis imperfecta.

5) The disparity in prevalence compared with previous studies might arise from racial differences or differences in diagnostic criteria used by various authors.

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ANNEXURE

ANNEXURE – I

PROFORMA

"Prevalence and distribution of selected developmental dental anomalies among patients visiting K.S.R. Institute of Dental Science & Research, Tiruchengode"

S. No :

OP.No:

Name:

Age/Sex:

Occupation:

Income:

Religion:

Address:

SHAPE ANOMALIES

☐ Microdontia ☐ Talon cusp ☐ Dens evaginatus,
☐ Fusion ☐ Macrodontia ☐ Peg shaped laterals

NUMBER ANOMALIES

☐ Hypodontia ☐ Hyperdontia

STRUCTURAL ANOMALIES

☐ Amelogenesis imperfecta (AI) ☐ Dentinogenesis imperfecta (DI)

POSITIONAL ANOMALIES

☐ Transposition ☐ Transmigration

ANNEXURE – II

INFORMED CONSENT FORM

Patient's consent for treatment

I hereby give my consent for the treatment procedure to be done in my interest or (in case of minors) Mr/Ms._____ who is my_____. The risk associated with the treatment procedures have been fully explained to me and I accept complete responsibility and exonerate K.S.R. Institute of Dental Science & Research, K.S.R. Kalvi Nagar, Tiruchengode in case of any complication thereof.

I also give my consent to use the data and photographs pertaining to my Case Report for academic and research purposes.

_____ ஆகிய நான் எனக்கு (அல்லது) எனது மகன் / மகள் _____ என்பவருக்கு சிகிச்சை எனது சம்மதத்தின்பேரில் தான் அளிக்கப்படுகிறது. இதனால் ஏற்படும் முன்பின் விளைவுகள் எனக்கு விளக்கப்பட்டது. இதனால் ஏற்படும் முன்பின் விளைவுகளுக்கு கே.எஸ்.ஆர். பல் மருத்துவக்கல்லூரி எவ்விதத்திலும் பொறுப்பில்லை. பல் மருத்துவக்கல்லூரி விதிமுறைகளை ஏற்றுக்கொண்டு சிகிச்சை பெற ஒப்புக்கொள்கிறேன்.

மேலும் நான் என் நோய் சம்மந்தப்பட்ட விவரங்கள் மற்றும் புகைப்படங்களை கல்வி மற்றும் ஆராய்ச்சிப் பணிகளுக்காகப் பயன்படுத்திக் கொள்ளவும் அனுமதிக்கின்றேன்.

Date :

Signature or thumb impression of the consentee
(கையொப்பம் அல்லது இடது கை பெருவிரல் ரேகை)

ANNEXURE – III

INSTITUTIONAL ETHICAL COMMITTEE

KSR INSTITUTE OF DENTAL SCIENCE & RESEARCH

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KSR Kalvi Nagar, Tiruchengode.

Member Secretary
Dr. G.S. KUMAR, MDS.,
Principal,
KSR Institute of Dental Science & Research,
KSR Kalvi Nagar, Tiruchengode.

Ref.: 063 /KSRIDSR/EC/2014 **Date : 09.01.2014**

To

Dr.P.V.Vishnudev,
Postgraduate Student,
Dept. of Oral Medicine & Radiology,
KSR Institute of Dental Science & Research,

*****

Your dissertational study titled "PREVALENCE AND DISTRIBUTION OF SELECTED DEVELOPMENTAL DENTAL ANOMALIES AMONG PATIENTS, VISITING K.S.R. INSTITUTE OF DENTAL SCIENCE AND RESEARCH, TIRUCHENGODE" presented before the ethical committee on 7th Jan. 2014 has been discussed by the committee members and has been approved.

You are requested to adhere to the ICMR guidelines on Biomedical Research and follow good clinical practice. You are requested to inform the progress of work from time to time and submit a final report on the completion of study.

Signature of Member Secretary,
(Dr.G.S.Kumar)